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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/059,270	01/31/2002	Claus Erdmann Furst	45900-000548/US	5415

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EXAMINER

WAMSLEY, PATRICK G

ART UNIT	PAPER NUMBER
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2819

DATE MAILED: 12/16/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
10/059,270

Applicant(s)
Claus Erdmann Furst

Examiner
Patrick Wamsley

Art Unit
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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 6) ☐ Other: _____

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DETAILED ACTION

Drawings

1. Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See M.P.E.P. § 608.02(g).

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed, such as "Sigma Delta Modulator Having Enlarged Dynamic Range Due to Stabilized Signal Swing."
3. The disclosure is objected to because of the following informalities:
 - a. Page 1, line 17: Change "analogue" to -- analog --.
 - b. Page 1, line 18: Change "analogue" to -- analog --.
 - c. Page 2, line 10: Change "imbedded" to -- embedded --.
 - d. Page 2, line 16: Change "analogue" to -- analog --.
 - e. Page 2, line 21: Change "minimised" to -- minimized --.
 - f. Page 3, line 20: Change "maximised" to -- maximized --.
 - g. Page 4, line 1: Change "optimised" to -- optimized --.
 - h. Page 4, line 13: Change "optimised" to -- optimized --.
 - i. Page 5, line 1: Change "continuos" to -- continuous --.
 - j. Page 6, line 12: Change "integrators" to -- integrators' --.
 - k. Page 7, line 6: Change "Gaussian" to -- Gaussian --.

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- l. Page 11, line 27: Change "minimised" to -- minimized --.
- m. Page 12, line 31: Change "substract" to -- subtract --.

Appropriate correction is required.

4. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

5. Claims 27 and 32 are objected to because of the following informalities:
- a. Claim 27, line 2: Change "continuos" to -- continuous --.
 - b. Claim 32, line 2: Change "continuos" to -- continuous --.

Appropriate correction is required.

Claim Rejections - 35 U.S.C. § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 30 and 35 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. There's no description of how to implement the claimed modulator in software code.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as indefinite.

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10. Description of examples or preferences is properly set forth in the specification rather than the claims. If stated in the claims, examples lead to confusion over the intended scope of a claim. Here, the use of “such as” on line 2 renders claim 5 indefinite as it is unclear whether the claim’s scope is limited to “adjusting gain parameters” or “adjusting the feedback gain.” See M.P.E.P. 2173.05(d).

Claim Rejections - 35 U.S.C. § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 1-9, 28-29 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,986,598 to Mittel, hereafter Mittel.

For claim 1, Mittel provides a method comprising the steps of providing an analog input signal to a $\Sigma\Delta$ modulator; determining an amplitude; and adjusting the output signal swing.

For claim 2, the signal swing for Mittel’s second integrator is inherently because the integrators are connected in cascade configuration [col. 2, lines 18-19].

For claim 3, Mittel’s first two integrators [110/130] are placed closest to the signal path, immediately after the analog input node.

For claim 4, the signal swing of Mittel’s integrators is below 20% of the full scale output signal level, as depicted in Figures 3-5.

For claim 5, Mittel adjusts gain parameters of the low pass and bandpass integrators.

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For claims 6 and 9, Mittel's $\Sigma\Delta$ modulator has cascaded integrators [110/130/150] and a comparator [180].

For claim 7, Mittel monitors the signal swing and reduces the output if the signal swing exceeds a predefined threshold value.

For claim 8, Mittel defines multiple thresholds [col. 6, lines 2-9], all of which are inherently related to the maximum stable input amplitude.

Claims 28 and 29 are misleading, as the claimed modulator and Mittel's modulator are neither fully analog nor digital; they both convert analog input into digital output.

Claim Rejections - 35 U.S.C. § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mittel.

Claims 26 and 27 define obvious variants. These species are not subject to restriction because they are inherently complementary. A modulator must inherently either be time discrete or continuous, with the selection of either option based upon the system's environment.

15. Claims 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mittel, in view of U.S. Patent 6,112,103 to Puthuff, hereafter Puthuff.

Unlike claims 14-19, Mittel is silent regarding the use of ADCs except in a generic communication system.

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Puthuff describes a communication device having an ADC [194]. At the time of the invention, it would have been obvious to one of ordinary skill in the art to have used Mittel's $\Sigma\Delta$ modulator as an ADC for Puthuff's device. The motivation would have been to use an ADC with stabilized signal swing, as suggested by Mittel.

For claim 14, Puthuff describes a microphone [col. 1, line 26] in a communication system.

For claim 15, Puthuff describes a hearing aid [col. 1, line 23] in the same context.

For claim 16, Puthuff discloses a cellular phone [col. 1, line 31].

For claim 17, Puthuff discloses a headset coupled to earpieces [400/402].

For claims 18 and 19, Puthuff's device also qualifies as a mobile unit, as it may be employed in hearing aids, cellular phones, or headsets.

16. Claims 10-13, 26-27, and 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mittel in view of U.S. Patent 5,744,969 to Grochowski et al, hereafter Grochowski.

Unlike claim 10, Mittel is silent regarding "Total Harmonic Distortion," hereafter THD. Grochowski, in contrast, calculates both THD and signal to noise ratio, hereafter SNR. At the time of the invention, it would have been obvious to one of ordinary skill in the art to have applied Grochowski's teachings to Mittel. The motivation would have been to provide accurate testing of Mittel's modulator, as suggested by Grochowski.

For claim 11, Grochowski provides a "least mean square" algorithm, which inherently involves using both the "mean square" values of noise power and amplitude. It's unclear if the

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cited expression is present in Grochowski, but even if it isn't involved, it would have been obvious to one of ordinary skill in the art to somehow compare RMS values in this manner.

For claims 12 and 13, Mittel's $\Sigma\Delta$ modulator has cascaded integrators [110/130/150] and a comparator [180].

Claims 31 and 32 define obvious variants. These species are not subject to restriction because they are inherently complementary. A modulator must inherently either be time discrete or continuous, with the selection of either option based upon the system's environment.

Claims 33 and 34 are misleading, as the claimed modulator and Mittel's modulator are neither fully analog nor digital; they both convert analog input into digital output.

17. Claims 20-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mittel / Grochowski, in view of U.S. Patent 6,112,103 to Puthuff, hereafter Puthuff.

Unlike claims 20-25, Mittel and Grochowski are silent regarding the use of ADCs except in a generic communication system. Puthuff describes a communication device having an ADC [194]. At the time of the invention, it would have been obvious to one of ordinary skill in the art to have used Mittel / Grochowski's $\Sigma\Delta$ modulator as an ADC for Puthuff's device. The motivation would have been to use an ADC with stabilized signal swing, as suggested by Mittel.

For claim 20, Puthuff describes a microphone [col. 1, line 26] in a communication system.

For claim 21, Puthuff describes a hearing aid [col. 1, line 23] in the same context.

For claim 22, Puthuff discloses a cellular phone [col. 1, line 31].

For claim 23, Puthuff discloses a headset coupled to earpieces [400/402].


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For claims 24 and 25, Puthuff's device also qualifies as a mobile unit, as it may be employed in hearing aids, cellular phones, or headsets.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick G. Wamsley whose telephone number is (703) 305-3504. Send facsimiles to (703) 308-6251.


Patrick G. Wamsley
December 12, 2002